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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/561,128

12/16/2005

Yoshikazu Kakura

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7590

02/15/2008

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EXAMINER

CHAMBERS, TANGELA T

ART UNIT

PAPER NUMBER

4141

MAIL DATE

DELIVERY MODE

02/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/561,128	Applicant(s) KAKURA, YOSHIKAZU	
	Examiner TANGELA T. CHAMBERS	Art Unit 4141	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>March 15, 2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the preliminary amendment filed on 12/15/2005.
2. Claims 1-17 are pending.

Priority

3. If applicant desires to claim the benefit of a prior-filed application under 35 U.S.C. 119(e), a specific reference to the prior-filed application in compliance with 37 CFR 1.78(a) must be included in the first sentence(s) of the specification following the title or in an application data sheet. For benefit claims under 35 U.S.C. 120, 121 or 365(c), the reference must include the relationship (i.e., continuation, divisional, or continuation-in-part) of the applications.

If the reference to the prior application was previously submitted within the time period set forth in 37 CFR 1.78(a), but not in the first sentence(s) of the specification or an application data sheet (ADS) as required by 37 CFR 1.78(a) (e.g., if the reference was submitted in an oath or declaration or the application transmittal letter), and the information concerning the benefit claim was recognized by the Office as shown by its inclusion on the first filing receipt, the petition under 37 CFR 1.78(a) and the surcharge under 37 CFR 1.17(t) are not required. Applicant is still required to submit the reference in compliance with 37 CFR 1.78(a) by filing an amendment to the first sentence(s) of the specification or an ADS. See MPEP § 201.11.

Information Disclosure Statement

4. The IDS filed on March 15, 2006 has been acknowledged by the examiner. Only the abstract of each reference was considered as the remainder of each document was written in Japanese.

Drawings

5. FIG. 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance

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with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities:

In the abstract, the referral elements (numbers) of the drawings should be deleted.

In the abstract, line 7, the word 'the' should be inserted before the word 'transmission'.

In the abstract, line 8, the first occurrence of the word 'and' should be deleted as it duplicates the last word of line 7.

Page 1, line 18, the word 'input' should be capitalized in 'Multiple-Input Multiple-Output'.

Page 21, line 28, the word 'in' should be deleted.

Page 22, line 1, the word 'at' should be inserted after the word 'is'.

Appropriate corrections are required.

Claim Objections

7. Claims 2-3 are objected to because of the following informality:

Claim 2 in combination with claim 3 under 37 CFR 1.75 are cited as being a substantial duplicate of claim 1. When claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

8. Claim 4 is objected to because of the following informality:

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The claim should be rewritten with the phrase 'that for' changed to the word 'of' on the fourth line of the claim for reading clarity.

9. Claims 11 and 17 are objected to because of the following informality:

The claims state that any of the packet success rate techniques may be used to determine reception quality. Therefore the word 'and' should be changed to 'or' on the last line of each of the claims.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. Claims 4-9 are rejected under 35 U.S.C. 101 because the claimed inventions are directed to non-statutory subject matter. Claims 4-9 are non-statutory because they are directed to an abstract idea (mathematical algorithms) without producing a useful, concrete and tangible result, and are therefore not eligible for patent protection.

Claim Rejections - 35 USC § 112 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1, 2 and 10 recite the limitation "a spread code assigning method" but are stated as being "in a code spread radio communication system". It is unclear whether a method or a system is being claimed. It is suggested that claims 1, 2 and 10 be rewritten with the words "in a code spread radio communication system" deleted.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, and 13-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1).

As per claim 1, Kuwahara discloses:

- ***A spread code assigning method, in a code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas, for assigning spread codes to each of the transmission antennas:*** (Kuwahara, Column 1, Lines 11-21 and FIG. 1, Column 10, Line 25 through Column 11, Line 12), Kuwahara teaches a spread code assigning method with a plurality of antennas, a transmitter and a receiver used for both receiving and demodulating.
- ***calculating a correlation value of each of the propagation paths between the transmission antennas and the reception antennas;*** (Kuwahara, Column 7, Line 55 through Column 8, Line 16).
- ***assigning, to the ith (i is an integer of 1 or more and M or less) transmission antenna having a propagation path of a correlation value exceeding a predetermined threshold value, only spread codes orthogonal to the spread codes of the jth (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value;*** (Kuwahara, Column 5, Line 61 through Column 6, Line 2 and Column 3, Lines 39-64), Kuwahara teaches

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that when a predetermined threshold is exceeded, reassignment of the spread code is carried out. Ideally, the spread code is reassigned to a short (orthogonal) code or a long code with orthogonality.

- ***assigning, to a transmission antenna having no propagation path of a correlation value exceeding the threshold value, spread codes without considering orthogonality to spread codes in the other transmission antennas.***

(Kuwahara, Column 11, Lines 56-65), Kuwahara teaches reassignment of spread codes if the threshold is exceeded; otherwise orthogonality is not considered and the spread code remains unchanged.

As per claim 2 and claim 3, Kuwahara discloses:

- ***A spread code assigning method, in a code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through Mth code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas, for assigning spread codes to each of the transmission antennas:*** (Kuwahara, Column 1, Lines 11-21 and FIG. 1, Column 10, Line 25 through Column 11, Line 12).
- ***calculating a correlation value of each of the propagation paths between the transmission antennas and the reception antennas;*** (Kuwahara, Column 7, Line 55 through Column 8, Line 16).
- ***assigning, to a transmission antenna having no propagation path of a correlation value exceeding the threshold value, spread codes without considering orthogonality to spread codes in the other transmission antennas.*** (Kuwahara, Column 11, Lines 56-65).
- ***preferentially assigning, to the ith (i is an integer of 1 or more and M or less) transmission antenna having a propagation path of a correlation value exceeding a predetermined threshold value, spread codes having a small cross correlation***

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value to spread codes of the j th (j is an integer of 1 or more and M or less, $i \neq j$) transmission antenna corresponding to the correlation value, wherein spread codes having a small cross correlation value to the spread codes of the j th transmission antenna are spread codes orthogonal to the spread codes of the j th transmission antenna. (Kuwahara, Column 5, Line 61 through Column 6, Line 2 and Column 3, Lines 39-64).

As per claim 4, the rejections of claim 2 and claim 3 are incorporated; and further Kuwahara discloses:

- **wherein a standard correlation value is calculated based on each of the correlation values of the propagation paths between the M transmission antennas and the N reception antennas, in the case that for preset L threshold values of $x_0, x_1, \dots, x_{(L-1)}$ ($0 \leq x_0 \leq x_1 \leq \dots \leq x_{(L-1)} \leq 1$), the standard correlation value is x_p or more and below x_{p+1} (p is an integer of 0 or more and $(L-1)$ or less), a code multiplex number for the transmission antenna corresponding to the standard correlation value is set to be $(L-p)$.** (Kawahara, Column 7, Line 55 through Column 8, Line 16), Kawahara teaches a method to calculate a correlation value based on each of the correlation values of the propagation paths.

Claims 13-15 are the system claims corresponding to the method claim 1 and are rejected under the same reasons as set forth in connection of the rejection of claim 1.

Claims 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Sudo (US Patent No. 7,298,722 B2).

As per claim 10, Sudo discloses:

- **A spread code assigning method, in a code spread radio communication system including a first radio transmission device provided with a transmitter for transmitting different first through M th code spread transmission signals from each of M (M is an integer of 2 or more) transmission antennas, and a second**

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radio transmission device provided with a receiver for receiving and demodulating the first through Mth code spread transmission signals through N (N is an integer of 1 or more) reception antennas, for assigning spread codes to each of the transmission antennas comprising: (Sudo, Abstract, FIG. 20 and Column 15, Line 4-39), Sudo teaches a spread code assigning method with a plurality of antennas, a transmitter and a receiver used for both receiving and demodulating.

- **detecting a reception quality at a time when each of said code spread transmission signals is received;** (Sudo, Column 19, Lines 16-26).
- **reducing, in the case that the detected reception quality is below an object minimum value, a maximum value of number of the spread codes assigned to the transmission antenna corresponding to the reception quality,** (Sudo, Column 25, Line 46 through Column 26, Line 24, "As a result, the signal level of code division multiplexed signal S5 ... is decreased in a propagation environment in which the received field level is high.").
- **increasing, in the case that the detected reception quality exceeds an object maximum value, the maximum value of the number of spread codes assigned to the transmission antenna corresponding to the reception quality.** (Sudo, Column 25, Line 46 through Column 26, Line 24, "As a result, the signal level of code division multiplexed signal S5 with a low degree of multiplexing is increased in a propagation environment in which the received field level is low[.]").

As per claim 11, the rejection of claim 10 is incorporated and further Sudo discloses:

- **wherein as the reception quality, any of a packet success rate, a signal to interference signal power ratio, and a bit error rate is used.** (Sudo, Column 6, Lines 40-47 and Column 25, Lines 59-65), Sudo teaches signal to interference ratio and received signal strength indicator as ways to determine reception quality.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Aoki et al (Aoki) (US Patent Publication No. 2004/0028157 A1).

As per claim 5, the rejections of claims 1-3 are incorporated; however, Kuwahara does not specifically disclose:

- ***wherein a correlation value compared with the threshold value is a standard correlation value calculated based on a cross correlation value of each of the propagation paths between the M transmission antennas and the N reception antennas.*** However Aoki, in an analogous art discloses the above limitation. (Aoki, Page 4, Paragraph [0070] – Page 5, Paragraph [0074]), Aoki teaches comparing a cross correlation value to a threshold value.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Aoki into the method of Kuwahara to compare a correlation value calculated based on the cross correlation value of each propagation path with a threshold value. The modification would be obvious because one of ordinary skill in the art would want a way to identify propagation paths which are larger than a threshold value. (Aoki, Abstract).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Sudo (US Patent No. 7,298,722 B2).

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As per claim 6, the rejection of claim 4 is incorporated; however, Kuwahara does not specifically disclose:

- ***wherein the standard correlation value is the maximum value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second ..., (i-1)th, (i+1)th ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas.*** However Sudo, in an analogous art discloses the above limitation. (Sudo, FIG. 22 and Column 17, Lines 12-38).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Sudo into the method of Kuwahara to have the correlation value be the maximum among the correlation values obtained. The modification would be obvious because one of ordinary skill in the art would want to increase frame synchronization. (Sudo, Column 17, Lines 39-43).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Aoki et al (Aoki) (US Patent Publication No. 2004/0028157 A1) and in further view of Sudo (US Patent No. 7,298,722 B2).

As per claim 7, the rejection of claim 5 is incorporated; however, neither Kuwahara nor Aoki specifically disclose:

- ***wherein the standard correlation value is the maximum value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths***

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between the first, second ..., (i-1)th, (i+1)th ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas. However Sudo, in an analogous art discloses the above limitation. (Sudo, FIG. 22 and Column 17, Lines 12-38).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Sudo into the method of Kuwahara to have the correlation value be the maximum among the correlation values obtained. The modification would be obvious because one of ordinary skill in the art would want to increase frame synchronization. (Sudo, Column 17, Lines 39-43).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Goto (US Patent Publication No. 2002/0037030 A1).

As per claim 8, the rejection of claim 4 is incorporated; however, Kuwahara does not specifically disclose:

- ***wherein the standard correlation value is an average value among the (M-1) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second ..., (i-1)th, (i+1)th ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas.*** However Goto, in an analogous art discloses the above limitation. (Goto, Pages 1-2, Paragraphs [0019]-[0023]).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Goto into the method of Kuwahara to have the correlation value be the average value among the correlation values obtained. The modification would be obvious because one of ordinary skill in the

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art would want to eliminate noise and improve accuracy of detecting the peak value of the correlation values. (Goto, Page 1, Paragraph [0021]).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1) in view of Aoki et al (Aoki) (US Patent Publication No. 2004/0028157 A1) and in further view of Goto (US Patent Publication No. 2002/0037030 A1).

As per claim 9, the rejection of claim 5 is incorporated; however, neither Kuwahara nor Aoki specifically disclose:

- ***wherein the standard correlation value is an average value among the (M-I) x N correlation values obtained by calculating correlation values of a propagation path between the ith transmission antenna and the kth (k is an integer of 1 or more and N or less) reception antenna with propagation paths between the first, second ..., (i-1)th, (i+1)th ..., Mth transmission antennas and the kth reception antenna for the entire reception antennas.*** However Goto, in an analogous art discloses the above limitation. (Goto, Pages 1-2, Paragraphs [0019]-[0023]).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Goto into the method of Kuwahara to have the correlation value be the average value among the correlation values obtained. The modification would be obvious because one of ordinary skill in the art would want to eliminate noise and improve accuracy of detecting the peak value of the correlation values. (Goto, Page 1, Paragraph [0021]).

Claims 12, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo (US Patent No. 7,298,722 B2) in view of Kuwahara et al (Kuwahara) (US Patent No. 6,804,216 B1).

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As per claim 12, the rejections of claims 10 and 11 are incorporated, however, Sudo does not specifically disclose:

- ***wherein a priority order of assigned spread codes is set for each transmission antenna, and in the case that the maximum value of the number of the spread codes assigned to each transmission antenna is relatively small, different spread codes orthogonal to each other are assigned to each of the transmission antennas.*** However, Kuwahara in an analogous art discloses the above limitation. (Kuwahara, FIG. 1, Column 3, Lines 34-51).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kuwahara into the method of Sudo to assign spread codes orthogonal to each other when the number of spread codes assigned to each transmission antenna is relatively small. The modification would be obvious because one of ordinary skill in the art would to use orthogonal codes to reduce inter-channel interference. (Kuwahara, Column 3, Lines 40-51).

Claim 16 is the system claim corresponding to the method claim 10 and is rejected under the same reasons as set forth in connection of the rejection of claim 10; however, Sudo does not specifically disclose:

- ***the transmitter is provided with a spread code assigning unit for assigning spread codes to each of the transmission antenna based on the code multiplex number control information.*** However Kuwahara, in an analogous art discloses the above limitation. (Kuwahara, FIG. 1, Column 10, Lines 44-53).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kuwahara into the system of Sudo to have a transmitter with a spread code assigning unit. The modification would be obvious because one of ordinary skill in the art would want to a way to determine and generate a spread code for assignment during CDMA communication. (Sudo, Column 10, Lines 44-53).

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As per claim 17, the rejection of claim 16 is incorporated and further Sudo discloses:

- ***wherein the reception quality is any of a packet success rate, a signal to interference signal power ratio, and a bit error rate.*** (Sudo, Column 6, Lines 40-47 and Column 25, Lines 59-65).

Conclusion

14. The prior art not relied upon but considered pertinent to applicant's disclosure is made of record and listed on form PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANGELA T. CHAMBERS whose telephone number is (571)270-3168. The examiner can normally be reached on Monday to Thursday, 8:30am-6pm Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chameli Das can be reached on 571-270-1392. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tangela T. Chambers

Patent Examiner

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February 11, 2008

/CHAMELI C. DAS/

Supervisory Patent Examiner, Art Unit 4141